V 14 X X X	TY 2017		TVL 10/00/2015
Fiscal Year:	FY 2016	Task Last Updated:	FY 12/29/2017
PI Name:	Bracken, Bethany Ph.D.		
Project Title:	Cognitive Assessment and Prediction to Promote Individualized Capability Augmentation and Reduce Decrement (CAPT PICARD)		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline Element/Subdiscipline:			
Joint Agency Name:	TechPort:		No
Human Research Program Elements:	(1) HFBP:Human Factors & Behavioral Performance (IRP Re	w H)	
Human Research Program Risks:	 (1) BMed:Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders (2) HSIA:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) Sleep:Risk of Performance Decrements and Adverse Health Outcomes Resulting from Sleep Loss, Circadian Desynchronization, and Work Overload 		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Address 2:			
PI Web Page:			
City:	Cambridge	State:	MA
Zip Code:	02138-4555 C	ongressional District:	5
Comments:			
Project Type:	GROUND Solicitat	ion / Funding Source:	SBIR Phase II
Start Date:	06/01/2016	End Date:	06/30/2018
No. of Post Docs:		No. of PhD Degrees:	
No. of PhD Candidates:	N	o. of Master' Degrees:	
No. of Master's Candidates:	No. c	of Bachelor's Degrees:	
No. of Bachelor's Candidates:		Monitoring Center:	NASA JSC
Contact Monitor:	Williams, Thomas	Contact Phone:	281-483-8773
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	NNX16CJ08C		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	NASA missions include long periods of low workload followed by sudden high-tempo operations, a pattern that can be detrimental to situational awareness and operational readiness. An unobtrusive system to measure, assess, and predict Astronaut cognitive workload can indicate when steps should be taken to augment cognitive readiness. This system can also support testing and engineering (T&E); engineers can accurately evaluate the cognitive demands of new tools and systems, as well as how they affect task performance. In our Phase I effort, Charles River Analytics designed and demonstrated a system for Cognitive Assessment and Prediction to Promote Individualized Capability Augmentation and Reduce Decrement (CAPT PICARD). CAPT PICARD: (1) robustly and unobtrusively performs real-time synchronous data collection with a suite of sensors to provide a holistic assessment of the Astronaut; (2) extracts, fuses, and interprets the best combination of indicators of Astronaut state; (3) comprehensively predicts performance deficits, optimizing the likelihood of mission success; and (4) displays the data to support the information requirements of any user. The solicitation defined the following Phase I goals: review physiological, neurophysiological, and cognitive assessments in extreme environments and long duration missions; design an algorithm to assess workload. We did focus on these goals; however, we went beyond them to also demonstrate a functional prototype by the end of Phase I. Based on the success of this Phase I effort, we recommend a Phase II effort to refine and develop each component of CAPT PICARD, and iteratively evaluate this system in an undergraduate lab, at a T&E lab at Johnson Space Center (JSC), and in a mission-like analog environment at JSC. Successful completion of these tasks will result in a tool that can both dramatically improve Astronaut mission readiness and the design and development of tools Astronauts use to carry out mission objectives.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2016. Reporting not required for this SBIR Phase 2 project.
Bibliography Type:	Description: (Last Updated:)